shall we say?—incessant talking, and she is generally admonished when she stammers, "Do not talk that way, or you will never get over it." Here we have the necessary conditions for recovery, namely discouragement of stammering and encouragement of spontaneous speech; and we also have the results, for the girls who are so situated recover.*

CONCLUSION.

The solution of the stammering problem is *stop stammering.* The sooner that is done, and the more the spontaneous speech is cultivated, the sooner will the problem be solved.

610 N. E. Moline Ave., Pasadena, Calif.

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*Pedagogical Seminary, March, 1916, Vol. XXIII, No. 1, p. 127; also June, No. 2, p. 153. Scientific American Supplement, July 6, 1918, Vol. LXXXVI, No. 2218, p. 10.

VOICE AND VOCAL PROJECTION.

Dr. John J. Levbarg, New York.

Voice is produced by the vibrations of the vocal cords due to the expiratory blast of air emitted from the lungs, and the quality is reinforced by the resonating chambers. To produce a correct vocal sound, five most important parts are active: (1) Motor—lungs; (2) Vibrator—cords; (3) Resonators—pharynx, nose, cavities of the head; (4) Articulators—lips, tongue, teeth; and (5) Thought—brain.

As in musical sounds, so in the voice, the three properties of intensity, pitch and quality are to be found.

The intensity depends upon the amplitude of the vibrations on the vocal cords, the force of air and the resonance cavities.

Pitch depends upon the length, thickness and tension of the vocal cords. Thus, you will find the female voice is of a higher pitch than the male, because of the lesser length of the bands in the female than the male.

The quality of tone or timbre of the human voice is due to the fundamental and overtones produced by the vocal cords and reinforced by those of the cavities of the head and chest acting as resonance chambers. The greater the number of vibrations of the cords the higher the tone.

The singing voice begins about the fifth year and changes very slightly until puberty. At puberty there is a great change, especially in boys. The voice in boys at that period becomes deeper or lower in pitch, thereby assuming the voice of an adult male. In girls there is some trivial change, but it is less noticeable. This period in which the voice changes and assumes its proper color, is known as the transition period. It usually occurs around the age of fourteen or sixteen years. At this period proper pains and attention should be given that the vocal cords should not have special stress put on them, as co-ordination of the surrounding tissues is disturbed by the changes which are taking place in the cords, and the shape, size and position of the laryngeal structures. During this period rigorous exercises should be avoided and in its stead a course in hygiene of health, proper exercises to develop especially the medium register, the theory of music and last, but not least, some musical instrument should be taught them. The proper time for one to study singing earnestly should be about the age of eighteen.

The range of the voice constantly increases with age, and the voice becomes stronger and richer in tone. Male and female voices gain in volume and in tone up to forty years of age and after that period, they do not gain any more, as the laryngeal structures become harder; the cartilages changes practically to bone, and the soft tissues become stiff and lose its flexibility.

In voice training it is essential that the pupil educate his mind. Education of conscious control helps toward direct control of the voice. Mind has control over all matter. The brain and spinal cord are the chief nerve centers, and all voluntary and involuntary action is directly or indirectly controlled by the cells in the nerve centers. The impulse from the centers are disseminated to every part of the body, resembling a great telegraphic system. The brain is the chief office and the cord and its nerves emanating therefrom are its branches. The faculty to think correctly and to govern oneself is situated in the brain. The brain is supplied by a great arterial system and in order to have good thought we must have good health. Breathing correctly gives us a good oxygen supply and oxygenated blood is the proper food for the mind.

There are no two singing methods alike. Two successful singers may sound a good deal alike, yet upon analysis the production will be found to vary greatly. Voices cannot be manufactured. Human voice is a very delicate instrument. It is susceptible to injury in a great many ways. Too much stress should not be put upon the vocal apparatus. Too much concentration on the muscles instead of the production of tone loses its naturalness. A singer who will never sacrifice his pronunciation for tone effect is sure to sing properly; but one whose diction is sacrificed in order to help tone is absolutely wrong. The proper pronunciation of a, i, e, o, u, will force the whole vocal apparatus to work with equilibrium and balance.

The voice has value only at the point to which it is addressed, namely, the audience. The human voice is able to carry to a great distance. In order to be able to carry the voice a great distance, it is necessary to concentrate the vocal effect in the mouth, as far forward as possible, at the same time focusing the tone at a desired point in the distance. It is helpful to fasten the gaze upon the person or place at which we intend to speak or sing; this assists in tone carrying capacity. Vocal projection or tone focus must be studied, not from the mechanical viewpoint, but from the mental. We should not attempt to listen to our tones as they leave the larynx, but should endeavor to hear them at the point of destination.

If the tone is perfect the production needs no correction. A full, flowing, sonorous, resonating tone, the product of complete naturalness on the part of the singer reflects his or her individuality. Individuality should be developed by each student as individuality creates a new type of singing.

The phonograph, although not in any sense a vocal teacher, is of great value to a singer. It reveals to the student his defects as well as his strong points. Faulty breathing and errors of diction, interpretation, tone placing are distinctly revealed.

The art of expression is a special talent which should be cultivated and developed with the aid of our imagination. A singer or speaker should leave with the audience the story, and the feeling of the song; not the impression of wonderful tone production. Vocal expression or interpretation must be instinctive, must be felt by the singer, who must for the time completely forget himself and his lessons.

In conclusion I may add that it is essential that a pupil be early convinced that the ear is the most important instrument in the process of producing and controlling tone. The ear must be trained to listen to the sound as it returns from its destination. By practicing diligently to hear correctly, will eventually enable the individual to hear himself as others hear him, and also help to improve his faults.

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1425 Madison Avenue.